

## AMENDMENTS TO THE DRAWINGS

Please replace sheet 3 of the drawings containing FIG. 4 with Replacement Sheet 3 enclosed herewith containing amended FIG. 4 wherein "53" has been corrected to --52--.

## REMARKS

In response to the Primary Examiner's Action mailed on March 20, 2006, applicant is submitting herewith a Petition for a one month Extension of time and a check in the amount of \$60.00 the fee required.

Further applicant notes the Primary Examiner's comment that only English Abstracts of Japanese Patent Publications were provided. This is because only English Abstracts were available to Applicant's attorney. If full copies of the Japanese patent publications are required, Applicant will be happy to obtain them and submit them to the Primary Examiner upon receiving a specific request from the Primary Examiner for such publications. However, it is to be noted that, from the English abstracts it does not appear that full copies of these Japanese Patent Publications are needed.

The Primary Examiner's objection to the drawings is well taken and by this amendment applicant is submitting a revised FIG. 4.

The Primary Examiner's objection to the specification, namely, the third full paragraph on page 8 is also well taken and Applicant has amended that paragraph to refer to non-oxidizing gas which is scientifically correct and now non-confusing.

With respect to the Primary Examiner's comments regarding claim 1, and for that matter all the claims, it is noted that some language was used in the last amendment to the claims which could be considered repetitious or redundant. Further the arrangement and purpose of the various light emitting diodes was not clearly set forth in the claims, particularly with reference to the disclosure in the specification.

Accordingly, applicant has amended claim 1 and claim 16 to make it clear that the visible light emitting diodes are used to enable a user of the method or apparatus to determine if power is being supplied to all the LED assemblies in the array of rows of LED assemblies on the panel.

Further the arrangement of the two groups of LED assemblies having two different wave lengths in the rows of the array was not clearly set forth in the previously presented claims. Upon reconsideration, applicant believes it is more appropriate to refer to a first group of LED assemblies emitting light at one

wavelength and a second group of LED assemblies emitting light at another wavelength.

Also, as specified in the specification the first group of LED assemblies are arranged in alternate rows in the array or are spaced apart or interspersed in the rows of the array on the panel.

Likewise, the second group of LED assemblies is also spaced apart or interspersed in the rows of the array on the panel or arranged in alternate rows of the array of rows on the panel.

Claims 1 and 16 have been amended to make this more clear.

The Primary Examiner will note that the subject matter of claims 31 and 32 have been incorporated, respectively, into claims 1 and 16. In other words, the concept of sensing light emitted by the UV LED's and then cooling the panel and/or UV LED assemblies to maintain a constant temperature thereby to maintain a generally constant light intensity, has been added to claims 1 and 16.

Further, in view of the Primary Examiner's objection to the phrase "identical degree of polymerization", this phrase has been deleted to make certain that no new matter or incompletely supported matter is introduced into the claims.

In response to the Primary Examiner's objections to the language in claims 1, 8, 16, 19 and 31-32 applicant has deleted the redundant language and the language referring to "surfaces" ... "facing".

The Primary Examiner's rejection of claim 1-4, 7, 13, 16, 18-20, 22, 27-28 under 35 U.S.C. §112, second paragraph for being indefinite as this rejection may be attempted to be applied to the amended claims, is respectfully traversed.

In support of this traverse it is noted that applicant is no longer referring to first and second arrays but rather to first and second groups of UV LED assemblies that emit UV light at a first wavelength and at a second wavelength, the first wavelength being different than the second wavelength. Also the arrangement or interspersing of the UV LED assemblies in the rows of the array of rows is now set forth even more clearly.

With respect to claim 20, applicant has amended claim 20 to make it clear that the splatter resistant protective device is positioned between the array of

rows of UV LED assemblies and the UV curable inks, coatings or adhesives on the surfaces of the products, articles or other solid objects for substantially preventing splatter from the UV curable inks coatings or adhesives from contacting the array of rows of UV LED assemblies.

With respect to claims 13 and 28, claim 28 has been cancelled and claim 13 has been amended to refer to the step of employing voltage matching techniques whereby the current drawn by the UV LED's of the first and second groups only varies between 5% and about 10%. This is consistent with the disclosure in the specification.

The Primary Examiner's rejection of claims 1-4, 7, 13, 16 18-20, 22, 27-28, 31-33 and 37-39 under 35 U.S.C. §112 first paragraph for failing to comply with the written description requirement, as this rejection may be attempted to be applied to the amended claims, is respectfully traversed.

In support of this traverse, it is first of all noted that applicant has deleted or changed much of the language objected to by the Primary Examiner.

More specifically the claims now clearly teach that a generally constant intensity of light is directed or distributed onto the UV curable inks, coatings or adhesives on surfaces of products, articles or other solid objects for curing them.

Applicant submits that the claims now are limited to what is actually taught in specification.

Further the claims have been amended to make clear the interspersing or arrangement of two groups of the UV LED assemblies which emit UV light at two different wavelengths in the rows of the array on the panel. The interspersing of the UV LED assemblies of each group in the rows of UV LED assemblies or in alternate rows of UV LED assemblies is now set forth more clearly in the claims. Further the claims now clearly state that a group of visible light emitting diode assemblies are secured to the panel in an array of rows of light emitting diodes on the panel to emit visible light for indicating to a user of the method or apparatus that power is being supplied to all the light emitting diodes in the array of LED assemblies on the panel. This is what is taught in the specification and what is now set forth even more clearly in claims 1 and 16.

Further this teaching is not new matter and is clearly supported by the specification.

The Primary Examiner's rejection of claim 1-4, 11, 13, 16, 18-20, 27-28 under 35 U.S.C. §103(a) for being unpatentable over Young U.S. Patent No. 6,561,640 or Biegelsen et al. U.S. Patent No. 6,536,889, optionally in view of Dowling et al. Published Patent Application No. 2002/0074559 or optionally further in view of Itou U.S. Patent No. 5,986,682 and of claims 31 and 32 (now incorporated into claims 1 and 16) further in view of the Ostler et al. Published Patent Application No. 2001/0046652 or Contois et al. U.S. Patent No. 4,908,701 or Kennedy et al. U.S. Patent No. 5,634,711 or alternatively in view of Malinen U.S. Patent No. 6,075,595 or Owen et al. Published Patent Application No. 2005/015246 as these rejections may be attempted to be applied to amended claims 1 and 16 and the claims dependent thereon, are respectfully traversed.

First of all in support of this traverse it is to be noted that claims 1 and 16 calls for a UV curing method or UV curing apparatus. The method and apparatus call for (A) emitting light from visible light emitting diodes that are included in an array of rows of light emitting diodes on a panel for the purpose of indicating to a user of the method or apparatus that power is being supplied to all the light emitting diodes in the array of rows on the panel.

This is not taught by the references cited.

Secondly, amended claims 1 and 16 call for (B<sup>1</sup>) emitting UV light from a first group of UV light emitting diodes at a first wavelength and that the first group of UV light emitting diodes assemblies are (C<sup>1</sup>) interspersed within a row(s) of the array of rows on the panel or in alternate rows of the array of rows on the panel.

Next amended claims 1 and 16 call for (B<sup>2</sup>) a second group of UV light emitting diode assemblies emitting UV light at a second wavelength different than the first wavelength and with the second group of UV light emitting diodes also being (C<sup>2</sup>) interspersed within a row(s) of the light emitting diodes of the array on the panel or in alternate rows of the light emitting diodes of the array on the panel.

Again this structure is not disclosed or suggested in the references cited.

Then claims 1 and 16 call for a system or method for (D) maintaining generally constant light intensity from the first and second groups of UV light emitting diode assemblies. This is accomplished by measuring the light intensity from the first and second group of UV LED assemblies. Then a heat sink and a fan are provided and when a change of light intensity is sensed the speed of the fan is increased to pass cooling air over the heat sink mounted to the panel or to the LED assemblies for cooling them thereby to maintain the temperature of the UV LED assemblies generally constant which in turn maintains the output light intensity from the UV LED assemblies generally constant. This is not taught by the references cited.

The intensity of the UV light at two different wavelengths is maintained generally constant for the purpose of curing the UV curable ink, coating or adhesive on the surface of the articles or products or items to be cured. This is also not taught by the references cited.

While Young et al. teaches two UV ultraviolet light emitting devices or systems 140 and 150 which emit ultraviolet light having at wavelengths within the range of wavelengths to which a photosensitive resin reacts, Young does not teach irradiating the resin with ultraviolet light at two different wavelengths. Further, Young et al. does not teach providing UV LED assemblies which are interspersed within rows of light emitting diodes in an array on a panel. It appears that the two ultraviolet light emitting devices 140 and 150 emit light sequentially onto a photo sensitive resin.

The same can be said for the Biegelson et al. reference which appears to use the same general structure as shown in Young et al.

Applicant does not appreciate the pertinency of the Dowling et al. reference since it merely teaches using ultraviolet emitting LED's in a purification device. Dowling et al. has nothing to do with curing UV curable inks coatings or adhesives on various objects or substrates.

Itou, while teaching staggered arrays of light emitting devices is directed to a recording apparatus for printing, for example, a lottery ticket, a bar code

label and other kinds of tickets. Itou has nothing to do with curing UV curable coatings, adhesives or inks on an object or substrate.

Applicant questions the Primary Examiner's asserted analogous nature of Itou and refers the Primary Examiner to the decision by the CAFC in the case of In re Clay, 23 USPQ 2d 1058 (Fed. Cir. 1992).

In In re Clay, supra., Clay's field of endeavor was "the displacement of liquid product from the dead volume of all underground fuel storage tank."

In In re Clay, supra., the CAFC stated that: "the art of gel treatment of underground formations to fill anomalies so as to improve flow profiles and sweep the efficiencies of injection and production fluids through a formation" (the field of endeavor of the patentee in the patent cited by the Examiner) cannot be considered to be within Clay's field of endeavor ("underground storage tanks") merely because both relate to the petroleum industry.

In the same manner, the field of "miniaturized recording apparatus for blocking off light in printing a bar code or ticket by optically fixing an image on a thermosensitive paper" cannot be considered to be within the field of endeavor of "a curing apparatus for applying UV light to UV photo initiators in UV curable inks, coatings, or adhesives on products " merely because both relate to applying light to a substrate.

See also the decision by the CAFC in the case of In re Oetiker, 24 USPQ 1443, where Judge Newman, speaking for the court, stated:

"In order to rely on a reference as a basis for rejection of the applicant's invention, the reference must either be in the field of the applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned. See In re Deminski, 796 F.2d 436, 442, 230 USPQ 313, 315 (Fed. Cir. 1986). Patent examination is necessarily conducted by hindsight, with complete knowledge of the applicant's invention, and the courts have recognized the subjective aspects of determining whether an inventor would reasonably be motivated to go to the field in which the examiner found the reference, in order to solve the problem confronting the inventor. We have reminded ourselves and the PTO that it is necessary to consider "the reality of the circumstances", In re Wood, 559 F.2d 1032, 1036, 202 USPQ 171, 174

(CCPA 1979) - in other words, common sense - in deciding in which fields a person of ordinary skill would reasonably be expected to look for a solution to the problem facing the inventor.

"It has not been shown that a person of ordinary skill, seeking to solve a problem of fastening a hose clamp, would reasonably be expected or motivated to look to fasteners for garments. The combination of elements from non-analogous sources, in a manner that reconstructs the applicant's invention only with the benefit of hindsight, is insufficient to present a **prima facie** case of obviousness. There must be some reason, suggestion, or motivation found in the prior art whereby a person of ordinary skill in the field of the invention would make the combination. That knowledge can not come from the applicant's invention itself."

In determining the applicability of a prior art reference cited, one looks first at the problem that is presented to one skilled in the art and then makes a determination of whether or not a reference is from analogous art. This is a two fold step.

In In re Wood, 202 USPQ 171:

"First we decide if the reference is within the field of the inventor's endeavor. If it is not, we proceed to determine whether the reference is reasonably pertinent to the particular problem with which the inventor was involved."

The next step in determining the applicability of the prior art reference, i.e., whether or not it is analogous or non-analogous art, is stated in In re Horn, 203 USPQ 969, where the CCPA stated:

"For the teachings of a reference to be prior art under 35 U.S.C. §103, there must be some basis for concluding that the reference would have been considered by one skilled in the particular art working on the pertinent problem to which the invention pertains. For no matter what a reference teaches, it could not have rendered obvious anything 'at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains' unless a hypothetical person would have considered it."



Further with respect to the non-analogous nature of the Itou patent, it is to be noted that there is no presumption that one of ordinary skill in the art is familiar with all prior art. In this respect, reference is made to the decision by the CAFC stated in the case of Kimberly-Clark v. Johnson & Johnson, 223 USPQ 603, where the Court stated:

"We hereby declare the presumption that the inventor has knowledge of material prior art to be dead. What controls the patentability of the fruits of the inventor's labors are the statutory conditions of 'novelty, utility, and unobviousness' to a person having ordinary skill in the art to which said subject matter pertains, as stated in §103. It should be clear that that hypothetical person is not the inventor, but an imaginary being possessing 'ordinary skill in the art' created by Congress to provide a standard of patentability, a descendant of the 'ordinary mechanic acquainted with the business' of Hotchkiss v. Greenwood."

See also In re Heldt, 167 USPQ 676 and Ex Parte Murphy and Burford, 217 USPQ 479.

Further in this respect, the Primary Examiner's attention is directed to the decision in the case of Ex parte Dussaud, 7 USPQ 2d 1818, where the Board of Appeals found that one skilled in the art of diaper making would not look to the carpet manufacturing process and equipment field to solve a problem in the application of elastic to a web in a curvilinear pattern.

See also U.S. Surgical Corp. v. Hospital Products International, 9 USPQ 1241 (DC Con. 1988), where the Court found that the relevant prior art for determining the obviousness of a surgical stapler is not found in the art of paper staplers despite citation to such art during the prosecution of the plaintiff's surgical stapler patent application.

Still further, see In re Pagliaro, Franklin, and Gasser, 210 USPQ 888, where the Court found that a method for producing a decaffeinated vegetable material suitable for use in preparation of beverages was non-obvious from prior art disclosing conventional decaffeination processes combined with the teachings in reference (Aiello) discussing the lipid theory of decaffeinated vegetable material suitable for use in preparation of beverages was non-obvious

from prior art disclosing conventional decaffeination processes combined with the teachings in a reference (Aiello) discussing the lipoid theory of narcotics.

The Court found the Aiello reference to be non-analogous, since it was merely a treatise pointing out how the Meyer/Overton lipoid theory of narcotics was inaccurate because it was based upon experiments using an oil/water mixture and an oil/water mixture does not approximate the substances found in the human body. Thus, the Court found Aiello's disclosure not to be "within the field of the inventor's endeavor". Further, Aiello was not pertinent to the applicant's problem because he was not concerned with either beverage preparation or decaffeination of vegetable material.

See also In re Fritch, 23 USPQ 2d 1780 (Fed. Cir. 1992) where the CAFC stated:

"Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under section 103, teachings of references can be combined *only* if there is some suggestion or incentive to do so.... The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification...."

For the forgoing reasons, applicant does not believe Itou is analogous art with respect to the teachings therein of a staggered array of LED assemblies (claim 1) or with respect to a mechanism for reciprocating an array of light emitting devices (claim 39).

Ostler et al. is directed to the use of light emitting diodes as a light source for curing dental composite materials with sufficient power while managing the heat generated to prevent heat damage to the LED's or to the patient. Ostler et al. discloses circular arrays of light emitting diodes but does not teach first and second groups of UV LED assemblies in rows of an array of light emitting diodes on a panel or the use of a group of visible light emitting diodes for the purpose of determining whether power is being delivered to the light emitting diodes on the panel.

The Contois et al. patent teaches adjusting the transmission density of a mask with a UV laser or other light source while monitoring the light output from an LED. Clearly Contois et al. does not teach the UV curing method or apparatus as defined now even more clearly in amended claims 1 and 16.

Kennedy et al. is directed to light emitting devices and particularly to a handheld light emitting device which includes cooling means for controlling the light energy output in photo curing material and for other applications. Kennedy et al. teaches a portable LED curing device which, as shown in FIG. 10, includes an array of LED's in a diode module, the diodes being arranged in concentric circles. This diode module is different than and not similar to applicant's staggered array of UV LED assemblies.

The Malinen patent has been cited for its teaching of a temperature controller for controlling the temperature of LED's in an LED spectrometer used primarily for measurement of fat, albumin and water content of food stuff raw materials based on measuring the 800 to 1050nm transmission spectrum applied to the food stuff raw materials. It appears that the principal object of the Malinen patent is to control the wavelength of radiation produced by light emitting diodes and dispense the radiation in a predetermined wavelength spectrum and guide the radiation to an object under measurement. To this end, Malinen uses a Peltier element connected in thermally conductive fashion with a reflective base for cooling and/or heating the radiation source to provide constant wavelength spectrum of radiation.

While Malinen teaches controlling a wavelength transmission spectrum of radiation used to measure the contents of food stuff by the heating and cooling of a light emitting diode for the purpose of maintaining a constant wavelength spectrum and intensity of the radiation on the food stuff, Malinen has nothing to do with a UV curing apparatus or method as called for in amended claims 1 and 16.

Owen et al. is directed to a high intensity, solid-state, light source for various applications including photopolymerization. In this respect Owen et al. controls the temperature, through liquid cooling, of light emitting diodes to


maintain a total power density output of light at a high level of at least 50mW/cm<sup>2</sup>. Owen et al. teaches measuring the power density at a work surface.

While Malinen teaches temperature control of LED's for controlling wavelength spectrum and Owen et al teaches temperature control of LEDs for maintaining a high light power output, neither of them teaches, individually or in combination with other references cited, the UV curing method and apparatus defined now even more clearly in amended claims 1 and 16 and including elements (A), (B<sup>1</sup>), (C<sup>1</sup>), (B<sup>2</sup>), (C<sup>2</sup>) and (D).

An earnest endeavor has been made to place this application in condition for allowance and an early and favorable action to that end is requested.

Respectfully submitted,  
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July 14, 2006

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